A HOSPITAL BASED STUDY ON FACTORS RELATED TO TEENAGE PREGNANCY AND THEIR OUTCOME IN A TERTIARY CARE CENTRE

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CERTIFICATE

This is to certify that this dissertation entitled **" A HOSPITAL BASED STUDY ON FACTORS RELATED TO TEENAGE PREGNANCY AND THEIR OUTCOME IN A TERTIARY CARE CENTRE"** is a bonafide work done by **Dr.Y.Sangeetha, M.D.,** Post Graduate Student of Pediatric Medicine, Institute of Child Health and Hospital for Children, Egmore, Chennai - 600 008, during the academic year 2003 - 2006.

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DECLARATION

I declare that this dissertation entitled **" A HOSPITAL BASED STUDY ON FACTORS RELATED TO TEENAGE PREGNANCY AND THEIR OUTCOME IN A TERTIARY CARE CENTRE"** has been conducted by me at the Institute of Obstetrics and Gynaecology, Chennai under the guidance and supervision of **Prof.Dr.K.R.Ravindran, MD., DCH., FIAP.,** It is submitted in part of fulfillment of the award of the degree of M.D (Pediatrics) for the September 2006 examination, to be held under the Tamil Nadu Dr.M.G.R Medical University, Chennai. This has not been submitted previously by me for the award of any degree or diploma.

(DR. Y.SANGEETHA)

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CONTENTS

INTRODUCTION

Adolescence is a developmental phase between childhood and adulthood with specific psychological attributes. It is a critical period in human development because it is during this phase that an individual begins to develop a stance towards the world. The journey from childhood to adulthood can present many obstacles to youth along the way. Between 10 and 20 years of age, children undergo rapid changes in body,size,shape,physiology and psychological and social functioning. Hormones set the developmental agenda in conjunction with social structures designed to foster the transition from childhood to adulthood.

How does one define adolescence? In Oxford's dictionary "it is a period between childhood and adulthood". It is a period from the beginning of sexual maturity to the completion of physical growth. "It is that period of life of an individual when society no longer views him or her as a child but does not yet concede him either the roles or the functions inherent in the status of the adult" precise definition by Holingshead.

Adolescence as a phase of development existed in some form long before it was recognized and conceptualized in United States in 1904 by G.Stanley Hall. Oxford English Dictionary traces the word itself to 15th century. It was first used in 1430. It meant " becoming an adult". Some 300 years before the birth of Christ,Aristotle complained that adolescents "are passionate and apt to be carried away by their impulses".Stage 5 of human development in Erikson's theory includes adolescence(Ego identity Vs Role confusion).

Adolescent marriages and teenage pregnancy continues to be widely prevalent and most important public health issue of concern in our country.Pregnancy among adolescents is a growing health concern in many developing countries(Kulin ,1980).This is because child bearing has been associated with many social and health risks that are sometimes very serious, and therefore,need targeting from both the curative and preventive health strategies.The developing countries in the world are undergoing social changes presently, which had been taking place in the middle of 19th century in USA.Thus the adolescence and the problems along with ,are surfacing in the developing countries.The developing countries are themselves in their adolescence and searching for their identity .The teenagers in these countries are thus “adolescents in adolescent countries”.

Early pregnancies have also been associated with higher than usual risk of morbidity during child birth and high incidence of maternal and perinatal health problems(UN,1989).Various reasons have been put forward to account for high incidence of teenage pregnancies.These include : early marriage often accompanied by means to prove ones fertility,lack of knowledge on contraception,economic and environmental condition in which she lives as well as her social status.On account of the various medical risk factors involved and enhanced fertility rate associated with this group,teenage pregnancies pose serious issues of major concern for the policy planners in demography as well as the public healthcare system.

While the problem of teenage pregnancies in developed world is mainly “accidental” born out of promiscuous sexuality,it is a deliberate choice of large

sections of people in developing countries like India. Legislative efforts fixing the minimum age of marriage for girls have not been effective to the maximum in bringing about the desired level of change for the better, perhaps, due to the negative impact/influence of the interplay of tradition and socioeconomic and cultural factors obtaining in a populous country like ours.

An understanding of interplay of various socioeconomic and cultural factors that are associated with and have a bearing on the adolescent marriage is an absolutely essential prerequisite. This will help in the formulation and implementation of suitable intervention programmes to effectively address the problems and concerns relating to improved general health care to this vulnerable groups and achieving reduction in fertility growth rate in the long run.

Some general studies relating to the teenage marriages/pregnancies have provided only broad indications of factors and issues involved and intervention strategy therefore. However, adolescent pregnancies continue to remain an important problem to be reckoned with. Given the vast diversity of tradition and culture superimposed by the regional imbalances and socioeconomic inequalities and the stratification resulting therefrom ,specific studies of well defined socioeconomic and/or cultural groups is necessary. These studies may help in formulating the most appropriate and effective intervention strategy that will adequately address the public health needs of these social groups as well as ensure achieving the desired objective of significant reduction in birth rate within a defined time frame.

The present study was undertaken in well defined socioeconomic group of urban and rural teenagers attending Institute of Obstetrics and Gynecology, Chennai for their delivery/abortions to get insight into the various socioeconomic and cultural factors influencing/promoting adolescent marriages and the medical risk factors involved so that a specific and more effective intervention strategy for the group could be thought of.

The results of the survey and the implications of the findings are presented and discussed in detail hereunder.

STUDY JUSTIFICATION

Pregnancy in adolescence is one of the main problems in the world with the prevalence rate varying from 2 – 25 %.In recent years, the prevalence rate is increasing probably due to low pubertal age, early onset of sexual activity in girls and lack of education on contraceptive methods. It is a problem to the society, a tenseful event to the obstetricians and the neonatologists, as these teenage mothers bear the brunt contributing to high maternal and perinatal mortality and morbidity in our country.

In the phase of a demographic explosion looming large over our heads, it is needless to emphasize the imperative to contain, if not arrest, this alarming trend, sooner than later. Success in such an endeavor depends on our ability to identify the critical factors contributing to increased fertility rate and devising suitable and effective strategies to drastically minimize their impact.

A more precise measure of fertility is age specific fertility rates defined as "the number of live births in a year to 1000 women in any specified age - group". This rate throws light on the fertility pattern. Information available so far points out to the dominant role played by the higher age-specific fertility rates in the age group 15 to 19 years, estimated as 0.061 in rural and 0.032 in urban areas, according to the NFHS - 2 India, 1998 - 1999. The seriousness of the problem can very well be gauged from the fact that teenage females of less than 15 years constitute about 35.3% of the total population in India and teenagers of 15 - 19 years constitute 10.3% and those giving birth in teenage also form a significant proportion[1]. According to WHO's estimates (1996), the

population in the age group of 10-24 years which was estimated as 284 million is likely to reach 340.4 millions by 2025 AD[2]. Preventing teenage marriages, thus will constitute the corner stone of any population control strategy.

Adolescent pregnancies add another important dimension to public health care, on account of the pathetic situation created where by children hold the responsibility for bringing up their children. Some of the most important medical diseases prevalent among teenage group, include chronic disorders like rheumatic fever, rheumatic heart disease and tuberculosis and nutritional disorders like anemia and malnutrition leading to high risk pregnancies among teenagers[3]. Pregnancy induced hypertension, antepartum and post partum hemorrhages, abortions, increased infant mortality rate and perinatal mortality rates are some of the obstetric and neonatal problems reported to be associated with teenage pregnancies. Added to this, are the alarming reports that 0.4 per cent of people in the 10 - 24 years age group have been proved HIV positive[2], the potential danger of which needs no elaboration.

Added to the above alarming scenario, what makes adolescent pregnancy a very serious problem beckoning out all our attention is not the so expected rate of success of our efforts in reducing growth rate so far. Legislative intervention through enactments such as Sarada Act of 1929 fixing the age of marriage for females at 15 years, the Child Marriage Restraint Act of 1978 enhancing the marriageable age limit for girls to 18 years[1], and the subsequent Revised Family Planning Policy of 1986, which stipulated a still higher age limit of 21 years had not helped much in their awared objectives, can very well be understood from the fact that the current fertility rate in India stands at 3.1 as compared to 1.4 for Japan and 1.7 for U.K.[1]

The salient features of population growth[1] at a glance are as follows:

(i) Approximately, 95% of this growth is occurring in developing countries.

(ii) Currently, one third of world's population is under the age of 15 years and will soon enter the reproductive bracket, giving more potentials for population growth.

(iii) The expected number of births per women, at current fertility rates : Africa 6.1; Asia 3.2; North America 2.0; Europe 1.6.

(iv) World population is currently growing at 176 people per minute; 10564 people per hour; 253542 people per day; and 92,543,000 per year.

Thus teenage pregnancies constitute a whooping percentage, on all India basis and even in Tamil Nadu, a state commended for its achievements in family planning, the mean prevalence rate of teenage pregnancy continues to be high at 29% and the situation in some districts like Dharmapuri is indeed very alarming with 51.0%[4]. Studies attempting to search for factors influencing the fertility of a population through analysis of its patterns and differentials by selected demographic and socio-economic characteristics have pointed to the over-riding negative influence of tradition, socio-economic and cultural factors on postponing the marriages till such a time the girl/boy reach the desired age for marriage. An understanding therefore, of the various socio - economic and demographic factors that act as determinants of adolescent marriages and pregnancies are absolutely imperative for designing appropriate intervention strategies for bringing down substantially the fertility rate and also provide need based health care to this high risk prone group.

REVIEW OF LITERATURE

Adolescent pregnancy occurs in all societies, but the level of teenage pregnancy and childbearing varies from country to country. The youngest mother whose history is authenticated in the world in Linna Madina, who was delivered by caesarean section in Lema, Peru, May 1939. Her age at the time of delivery was 5 yrs and 8 months. Although adolescent marriage is a cognizable offence these marriages are still common in most of the states of India. Adolescent girls are not physically and mentally developed for marriages, which often lead to abortions, still births, low birth weight and poor survival of the live borns.

A pregnant teenager " A child in a child" has to meet the growing demands of her fetus in addition to her own growing needs, thus pushing her in a stressful situation. Global review shows that pregnancy in adolescence affects both.

Baby	**Mother**
IUGR LBW ↑ Preterm, ↑ perinatal morality rate ↑ Infant mortality rate	↑ Maternal Mortality ↑ Maternal morbidity

World population trends

It required all the human history upto the year 1800 for the world population to reach one billion. Though the 20th century began with a world population of 1.6 billion people - it ended with over 6 billion individuals. The united nations estimated that the "child 6 billion" was born on 12th October 1999 (Population Today - September, 1999). This was the second time there was a "child 6 Billion". The first was born around 4136 BC. Since 96 million are added each year to the world's population, it is projected to increase to 7.9 billion by the year 2025 and 11.5 billion by the year 2050, most of this growth occurs in developing countries. If today's teenage women delayed having their first child 2.5 yrs later than the current average, the world's population would be 10% lower than now projected by the year 2100; if there was a delay of five years, there would be a 20% decrease in the population, or a drop of 1.2 billion humans.

Overall there are over 14 million adolescents who give birth each year in the world : 5.7 million are in Asia, 4.5 million in Sub - Saharan Africa, 2.1 million in the middle east + North Africa and 1.3 million in the developed countries. (Alan Guttmacher Institute, 1998).

Child bearing in females ages 15 - 19 years speeds population growth by reducing the number of years between generations. In Europe, 2% of women aged between 15 - 19 years gives birth each year versus 4% in Asia, 5% North America, 8% in Latin America (and the Caribbean) and 12% in Africa. The overall average for the world is 6%. There is a considerable range in Asia : 1% in Japan, 2% China, 4% Srilanka, 8%, Phillippines, 9% Thailand, 15% Indonesia, 18% Pakistan and 28% India.

Developmental Aspects

Although biologically ready for pregnancy, many young teenagers are neither psychosocially nor cognitively mature enough to really understand what this process is about or implies for their future. They are neither financially nor emotionally ready to care for their baby on a day to day basis.

Early adolescents (10 - 14 yrs) are often the most helpless. From a biological view, they are undergoing rapid puberty (with enormous musculo skeletal and sexual growth). Their thinking skills are concrete, with minimal ability to think about the future. If these young teens are sexually active, they do not comprehend that pregnancy may result and often are not good at taking contraception. These young teens often do not make good parents unless other factors intervene.

Mid adolescents (15 - 16 yrs) are better able to understand the risks of sexual activity, but may not avoid pregnancy out of pre - occupation with adolescent issues. They do not appreciate nor accept the demands of being a parent.

Late adolescents (17 - 19 yrs) have developed more maturity and with appropriate support, can be good parents if they choose to take on this responsibility. They are more likely to be married than younger teens and this may help if family and partner/spouse are supportive. Problems may arise if they become the parent of more than one child - these demands can tax the most mature adult, but cause considerable problems for this youth. Again, cultural issues can influence this process to a considerable extent in various countries.

Puberty

Adolescents, have entered into puberty at earlier ages over the course of the 20th century around the world, especially in the developed countries. In the united states, new definitions of precocious puberty are being developed, being under 6 - 7 years in certain groups. Delaying marriage beyond teen years has considerable advantages, as it results in more education and vocational opportunities and as a result will reduce the rates of unwanted pregnancies and sexually transmitted diseases.

Adolescent Pregnancy risks

Teenage child bearing risks can be considerable and involve many aspects of her life as well as her family, her infant and the infant's father. Nearly 600,000 females die each year from pregnancy and child birth; Most of these deaths are in the developing world, accounting for 227,000 maternal deaths in South east Asia. The obstetric risks are not greater than with adults, if the pregnant teenager receives prenatal services which begin early and are comprehensive. However, lack of appropriate prenatal care compromises the outcome too often. For example, not over 25% of teen mothers give birth in a hospital or health center in South East Asian Countries.

In Bangladesh, less than 50% of pregnant teens receive prenatal care. Thus, the risks are not because of age alone (15 - 19 years), but additional factors which compromise health care and which lead to 2 - 4 times increase in maternal mortality rates for adolescents Vs adults. There may be an increased risk for maternal pre - eclampsia due to age, but other problems (as increased

premature labour, spontaneous abortions and still births) are related to such issue as limited health care, educational level, socio economic status and parity. Teenagers may not be fully developed and problems with birth may occur due to small uterine size. Also, teen mothers who can cope with one baby, may find it impossible to deal with additional children.

Risks for Children for Adolescents

The teenage girls are usually malnourished, anaemic and therefore prone to develop variety of infections. Teenage pregnancies in general have a poor outcome compared with infants born to older woman. Those born to mothers less than 15 years old are more than twice as likely to weigh less than 2500 grams at birth and are nearly three times more likely to die within first 28 days of life. The relatively high death rate of neonates of very young mother is primarily due to the higher incidence of LBW.

Over 4 million newborn babies die each year in the world, most due to poor prenatal care afforded the mother. Low birth weight is a major part of this mortality : 14% of first - born infants whose mothers are 14 years of age or less, weight less than 2500 grams at birth : this is in contrast to 5.8% noted with mothers who are 25 to 29 years of age. Also, prematurity is noted in 14% of infants with mothers under 15 years of age, versus 6% in 25 - 29 year old mothers. Prematurity, low birth weight and increased neonatal/infant morality rates are increased with limited prenatal care, poverty, poor nutrition, incomplete pubertal growth, reduced family support, limited education, and sexually transmitted diseases.

There is also increased illness and death for infants (30% increase in the first year of life) whose mothers are 17 years of age or less (regardless of parity) and for 18 to 19 year old multiparous mothers. The mortality rates are nine times higher due to violence (including accidents) and sudden infant death syndrome (SIDS). Children whose mothers were teens at birth tend to have more problems in school, due to lower intelligence, reading ability and communication scores along with increased developmental delay, hyperactivity and impulsiveness. A young teen may not be mature enough to be sensitive to her child's needs, may have limited parenting skills and may provide inappropriate discipline. These children become teenagers at increased risks for teenage pregnancy and sexually transmitted diseases.

In view of the realisation of the need to understand various socio-economic and cultural factors for formulating suitable intervention programmes, a number of studies, especially have been carried out by several socio-medical researchers in India and abroad. The salient features of such reported works especially those having direct relevance to the present investigation are briefly summarized hereunder.

I. Socio-Economic and Cultural factors

a. Religion

In India, marriages are universal and sacramental. Every one, gets married and participates in reproduction earlier. Data indicates that about 60% of girls aged 15 - 19 years are already married. The individual's economic security or emotional maturity are seldom a pre requisite to marriage. It was

reported by Singh and Richard (1989),[5] based on their studied conducted in Tamil Nadu that age at marriage of Christians in both rural and urban areas was much higher among both husbands and wives and was the lowest among Muslims. Most of the studies conducted in India have indicated a higher age at marriage among Christians followed by the Hindus and the Mulsims (Mukherjee, 1973[6], Kurup and Gunasekaran, 1976[7]; Patnaik, 1981[8]; Singh and Richard, 1989[5] Mukherjee, 1992[6]). Based on the area census study for the four Asian Countries namely Korea, Malaysia, Pakistan and the Philippines, Smith and Kareem[9] concluded that the mean age at marriage of females was higher for Christians followed by Buddhists and considerably lower for Hindus (17.2) and the lowest for the Muslims (16.6). The World Fertility Survey of Asia (1981) found that in Asian-Pacific countries namely Bangladesh, Nepal, Srilanka and Fiji the age at marriage was in the order-Christians>Buddhists>Hindus>Muslims. Contrary to the above trend the report of the Registrar General of India (1988)[10] stated that the age at marriage of rural Muslim women was higher than that of Hindus.

It has been pointed out that Christians have the highest mean age at marriage for both male and females (24 and 19 years) respectively, irrespective of regions. On the other hand, Muslim women in urban areas marry at an early age compared to other religious groups.

C. Education and Economic status

Education and economic status has been reported to exert a correlated influence on age at marriage. The 2001 census showed that only 65.38% were literates.

Education plays an important role which directly influences the age at marriage for both the boys and girls. Education changes the attitude from tradition to modern. A number of studies in India and other parts of the world have revealed a significant positive relationship between education and mean age at marriage (Audinarayana, 1990[11]. Adlaka et al, 1991)[14]. The Mysore population study (UN 1961)[15] conducted jointly by United Nations and the government of India reported that education, particularly after primary school level, was the potent factor affecting age at marriage in urban areas. In both Bangalore city and the town, women who were born in 1928-1932 and had a primary school education were found to have got married only one year earlier. However, much larger differences were found between women with a middle school education (16 yrs) and who had gone above high school level (20.0 years) in Bangalore city.

Krishnamoorthy (1974)[16] from a cross-sectional sample survey of about 3000 households in Batlagundu block of Tamil Nadu found that the economic and educational status are positively related to age at marriage of women, and age at marriage was negatively associated with fertility. Zachariah (1984)[17] reported that the average age at marriage was higher (21.8 years) among those women educated upto10th class or more than for illiterate women (17.5) years.

Smith (1980)[9] examined Asian nuptiality patterns in relation to educational attainment, labour force participation, urbanisation and found evidence of consistent positive relationship between education variables and age at marriage for both sexes. He also reported differences in the age at marriage of men and women in rural and urban area. Code (1990)[18] concluded

that the patterns of marriage and inheritance vary greatly in India particularly between regions of the north and the south. The reasons mentioned for late marriages and higher practice of contraception by females include literacy and participation in the labour force. Even with the same educational categories, age at marriage was higher in Kerala and Tamil Nadu than in northern states.

A similar positive trend in women's literacy level and age at marriage among four major states in India was reported by Mukerjee (1992)[6] based on 1991 census data. Bagath (1990)[19] observed that both in rural and urban area, women working as cultivators, agricultural labourers, or in mining and quarrying activities had a lower age at marriage, (less than 17 years), as compared to those employed in transport, communication and other services (above 19 years). In 1988, the Registrar General of India[10] reported that the age at marriage of female increased as the level of education went up.

As regards, higher the occupational status and skills required for the particular job, both men and women tend to marry later (Audinarayana 1990)[11]. Zachariah (1984)[17] based on the data from 27 village of Punjab found that over 70% of marriages were solemnised by the age of 20 among the lower status group while not even 50% of the women have been married by this age in the upper status group.

D. Fertility Rate and Age at Marriage

Rankumar et al. (1987)[21] observed that both education and age at marriage influenced fertility rate and concluded that the latter has greater effect. Zachariah (1984)[17] attributed the fertility decline in Kerala to an

increase in the age at marriage and consequent decrease in the proportion of women married. Several Investigators have found a definite positive relationship between age at marriage and fertility. Based on a study conducted among four cultural groups, Audinarayana (1990) reported that those women who married at the age of 13 years or less had on an average 4.37 children while those who got married at 18 years and above have comparatively lesser number of children. According to the UN Report (1987)[22] marriage is an important proximate determinant of fertility and influences fertility through its impact on the duration of regular sexual exposure to the risk of child bearing. Increase in the age at marriage reduces the number of years available for reproduction which in turn may reduce fertility.

E. Age at Marriage, Cultural and Regional factors

Differences in the patterns of age at marriage and its influence on fertility among cultural groups have been reported in certain cases. Arjun Adlakha et al. (1991)[14], who made a comparative study based on DHS and WFS data found that early marriage was more prevalent in sub-Saharan Africa than in Asia, North Africa and Latin America, the mean difference being 3 years.

Malakar (1987)[23] observed that the age at entry into the marriage is very low in India and the place of marriage is high with almost universal marriage for both the sexes. The influence of cultural factors was stressed by Jejee Boy (1991)[24]. She reported that culturally, women have enjoyed higher status in Tamilnadu than in other parts of the country. She attributed that in Tamilnadu,

the age at marriage of women is relatively high and women retain close links after marriage with their natal families.

II. Age at Marriage and Medical Risk factors

One aspect that has received considerable attention of the medical personnel especially in the form of hospital based studies has revealed the higher levels of medical risk factors due to teenage marriages. Srivatsava et al. (1985)[25] reported that age at marriage was negatively related with incidence of child mortality, the reason being the advance of physical immaturity of mothers on health and survival prospects of children born to such adolescent mothers.

ANAEMIA

W.H.O. expert group proposed that anaemia in pregnant female is considered to exist if the haemoglobin content falls below 11 gm/dl. In developing country like India, anaemia has been the most common health problem associated with pregnancies in general and adolescent pregnancies in particular. The incidence of anaemia in India is highest among women and children, varying between 60 to 70 percent with iron deficiency as a common cause. Recently, it has been shown that there is a high prevalence of folate deficiency anaemia in pregnancy. In India 20-40% of maternal deaths are due to anaemia. Abortions, premature birth, postpartum haemorrhage and low birth weight were associated with it.

Shobhana Patted et al. (1997)[26], based on a retrospective case record analysis of outcome in 347 consecutive teenage mothers, most of them primigravidas, found that there was an increased incidence of anaemia to the

tune of 16.9 percent and antenatal care was inadequate in 40.3 percent cases. Reddy Rani et al. (1992)[27] studied 90 teenage mothers between 12-19 years and reported that 80 percent of the adolescent mothers had antenatal anaemia and most of them had a Hb value of less than 10.

Clinical studies involving 1883 teenage pregnancies in the Govt. RSRM hospital during 1982[28] revealed only 12.7% anaemia among the group (77%) were from low socio-economic strata and a majority of them form rural areas or urban slums. Literacy rate was also very low among them. Guptha and Mirchandhani (1978)[29] found a high incidence of a anaemia among adolescent pregnant women (74%). Similar reports of increased anaemia in teenage pregnancies have been made by other workers also (Ghose et al., 1976; Gosvami et al., 1979; Bhalrao et al., 1990)[28].

Abortions

"Abortion" is defined as the termination of pregnancy before the foetus becomes viable at 28 weeks, when the foetus weighs 1000 grams. Spontaneous and induced are the 2 types. Abortion constitutes one of the serious obstetric complication found among adolescent pregnancies. Haemorrhage, sepsis and shock are the important complications. In India, M.M.R. due to abortions is 7.8/1000 random-abortions[1]. In general population, abortion incidence is about 40 - 70 / 1000 women of reproductive age.

Spitz et al. (1996)[30] based on a comparative retrospective analysis of trends of abortion among normal US adolescent pregnants for the year 1980

and 1990 concluded that the abortion rates were 35.8/1000 and 36/1000 respectively. Slonim-Nevo et al. (1985)[28] reported that second trimester abortions constituted a major part among teenagers.

Based on a comparative study of pregnancy related complications in 1542 cases of teenage mothers and 10,609 older mothers, Seeniammal and Radhika, (1983)[28] reported that abortions in the teenagers below 15 years formed a significant 30 per cent whereas in the age group 16-19 years, the incidence was only 19.19 percent which was not appreciably higher than that in the group above 20 years. On the other hand, Sreenivasan et al. (1983)[28] reported a relatively lower incidence of (12.1) percent abortions in teenage mothers. Still lower levels of spontaneous abortions in teenage pregnancies (9.8%) was reported by Nafesa Beevi et al. (1983)[28] in a study. Jayalakshmi et al. (1983)[28] in their study about teenagers in Madurai Medical college hospital in 1987 found that incidence of abortion was (14.7) percent, (99.0) percent occurring in teenage pregnancies 16-19 years and a very small percentage of 0.94 only among 13-15 years group.

Pregnancy Induced Hypertension

Increased blood pressure and presence of albumin in urine indicates pregnancy induced hypertension. Another health disorder of common occurrence in teenage pregnancy is pregnancy induced hypertension. Goswami et al. (1982)[28] in their study carried out in a rural subdivisional hospital in Bengal found that 6.95 percent had eclampsia. In a Medical College Hospital at Calcutta, a comparative study on teenage pregnancies by Ghosh and Sarkar (1983)[28] revealed incidence of preeclamptic toxaemia to be 14.6 percent in

teenagers against 31.0 percent in the control group (>20 years). Srinivasa et al. (1982)[28] conducted a study on 1,883 teenage mothers at the Govt. RSRM hospital, Chennai and found 221 cases of PIH giving as incidence of 11.7 percent of which eclamptic cases accounted for 34 cases giving an incidence of 1.8 percent.

Reddi Rani's[27] study conducted at Jipmer Hospital Pondicherry revealed the incidence of PIH to be (31.93) percent. Leppert et al. (1985)[36] noted that teenage pregnancies are more than twice as likely to experience toxemia than older women.

Type of Delivery Among Teenage Mothers

A comparative study of teenage pregnancies by Gosh Sarkar[28] revealed a caesarean section rate of (8.44) percent in teenage mothers compared to (7.3) percent in controls. But the results of a study conducted by Sholapurkar[28] at the Sholapur Medical College revealed that operative interference was more frequent in adult primiparas than among teenagers. Similarly caesarean section rate reported was only (3.4) percent in a rural hospital-based study by Modak (1987)[28] and (4.98) percent by Goswami and Goswami (1983)[28]. There are also reports of a very high incidence of (31.6) percent abortions among teenage girls as reported by Shobhana Patted (1997) KMC, Manipal[26]. Teenage pregnancy is known to be associated with increased obstetric complications and the obstetric outcome of teenage pregnancy is reported to be influenced by many socio-medical factors.

Preterm Delivery

Babies born before the end of 37 weeks of gestation are called preterm babies. The main causes of preterm delivery are multiple gestation, acute infections, hard physical work and hypertensive disorders of pregnancy. Kondamudi and Bhatacharya[32] conducted a retrospective review of adolescent deliveries at the maternity unit of General Hospital, Greneda in the year 1987-1988. Chisquare test and Fishers exact test analysis revealed increased risk of preterm delivery, prematurity and small for gestational age infants in the younger adolescents, (less than 16 years).

(Cooper and Alexander)[33] carried out a study on the effect of maternal age in birth outcomes on young adolescents (10-15 years). Univariate analysis indicated that the youngest adolescents were at the highest level of risk for preterm deliveries, low birth weight and small for gestational age babies (SGA). Petra and Otterbled Obuson[34] had conducted a study on determinants of poor pregnancy outcomes among teenagers in Sweden, and reported that those in the age group of 17 years or less were at a higher risk for preterm birth. Bradley A.Yoder et al.[35] in a study on (odd's ratio 1.6) pregnancy outcomes of teenage mothers in military population came to the conclusions that the risk for premature delivery and low birth weight are related to maternal race and lower paying rank, than the age of the mother (Logistic Regression Techniques).

Shobhana et al. (1997)[26] after a study on factors related to adolescent pregnancy at Kasturba Medical College, Manipal reported 12.83 percent of

preterm deliveries. Similarly, an analysis of pre-term deliveries in a group of 90 teenage mothers, conducted a Jipmer Hospital, Pondicherry by Reddy Rani et al. (1992)[27] revealed 29 percent pre-term deliveries among the study group. The incidence of prematurity among teenagers was 14.5 percent in a study carried out by Nafeesa Beevi et al.[28] at the Institute of Obstetrics & Gynaecology, Chennai.

Perinatal Mortality

Perinatal Mortality includes both late foetal deaths (Still births) and early neonatal deaths, with weight at birth more than 1000 grams and >28 weeks gestation. Prematurity has been reported to be the major cause accounting for most deaths in the teenage pregnancy group as reported by Naffesa Beevi et al. (1983)[28] in a study conducted at the Institute of Obstetrics and Gynecology, Chennai.

It is obvious that the various differentials exert their final influence on age at marriage and consequent impact on fertility, not in isolation, but in unison, interacting amongst each other at different levels and to varying degrees.

OBJECTIVES

- To understand various social, economical, cultural and other demographic factors related to adolescent pregnancies.
- To assess the nature and magnitude of various medical risk factors prevalent among the teenage pregnancy group.
- To study the awareness of small family norms and the effectiveness of the existing public health care system in promotion of awareness in the adolescent pregnancy group.
- To study complications and outcome of adolescent pregnancies.

MATERIALS AND METHODS

Study design

Hospital based Cross Sectional quantitative survey.

Study period

August 2004 to March 2006.

Study Place

Institute of obstetrics and gynecology, largest tertiary care hospital in Chennai.

Study population

All adolescent pregnant women admitted at I.O.G, Chennai.

Inclusion Criteria

All adolescent pregnant women age ≤ 19 years admitted in I.O.G for delivery / abortion.

Exclusion Criteria

Adolescent pregnant women who have not given their consent.

Sampling Technique

All consecutive adolescent pregnant women ≤ 19 years admitted in the I.O.G, Chennai during the study period for delivery / abortion. Total case were 526. 26 of them did not give their consent and hence excluded.

Maneuver

Adolescent pregnant women (≤ 19 years) attending IOG hospital for delivery abortions were included in the study. A proforma is designed and developed, pretested to collect information from all adolescent pregnant women for quantitative analysis (Annexure A). Data was collected from the adolescent pregnant women after developing good rapport with patient and all details were collected and maintained in strict confidentiality. Certain guidelines were followed when interview teenagers : (1) establish rapport, (2) Create an appropriate atmosphere, (3) maintain confidentiality (4) obtain complete information, and (5) document the interview session. Privacy, minimal interruptions, receptiveness and attention were maintained during interview. Other antenatal details and details of previous pregnancies were collected from case record. The gestational age and anthropometric measurements of the neonate were examined and recorded. All the datas were analysed, tabulated and statistically correlated.

OBSERVATIONS

During the study period, 526 adolescent pregnant women, fulfilled the inclusion criteria. Out of there, 26 had to be deleted from the study, as they did not give their consent. Hence the total number of cases analyzed for the study were 500. These adolescent pregnant women were analyzed for a number of variables as follows.

Table . 1

Age at Pregnancy

Age (Years)	Number	%
15	4	0.8
16	21	4.2
17	87	17.4
18	160	32.0
19	228	45.6

No pregnancies were recorded in age group < 15 years. Between 15 - 17 years, the distribution was 22.4% while in the late teens (18-19 years), it summed up to 77.6%.

Table . 2

Residence

Residence	Number	%
Rural	168	33.6
Urban	311	62.2
Others	21	4.2

62.2% of adolescent pregnancies in the study were from urban population, 33.6% from the rural population and others (like migrants) contributed 4.2%.

Type of dwelling

49.2% of adolescent pregnant women in the study group lived in huts 41.6% of them lived in kutcha houses. Only 5.6% of the study group lived in Pucca houses (Fig. A).

Religion

Hindus, constituted the majority 78.4% of the study group, the Christians and Muslims accounting for 10.8% and 8.6% respectively and others include 2.2% (Fig. B).

Table . 3

Marital Status

Marital Status	Number	%
a. Married	488	97.6
Separated	16	3.2
Divorced	-	-
Widowed	5	1.0
b. Unmarried	12	2.4

Majority (97.6%) of them are married. Unmarried women were 12 out of total 500 (2.4%). 112 out of 488 had self arranged marriages and the remaining 376 out of 488 had family arranged marriage.

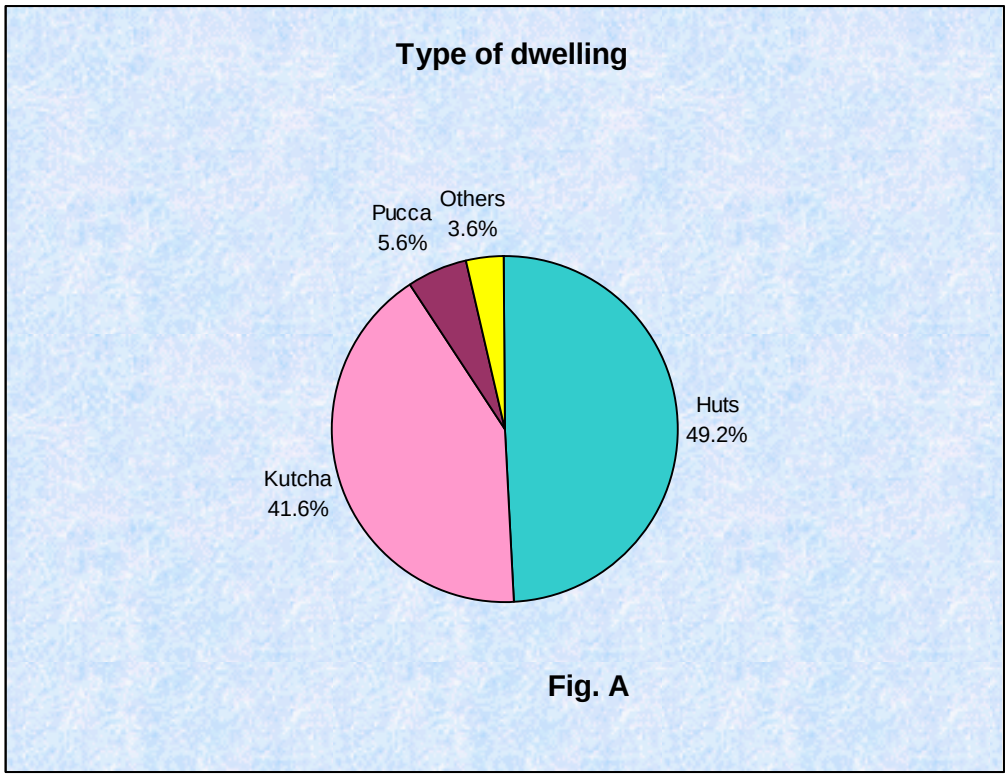

Type of dwelling
Pucca
5.6%
Others
3.6%
Huts
49.2%
Kutcha
41.6%

Fig. A

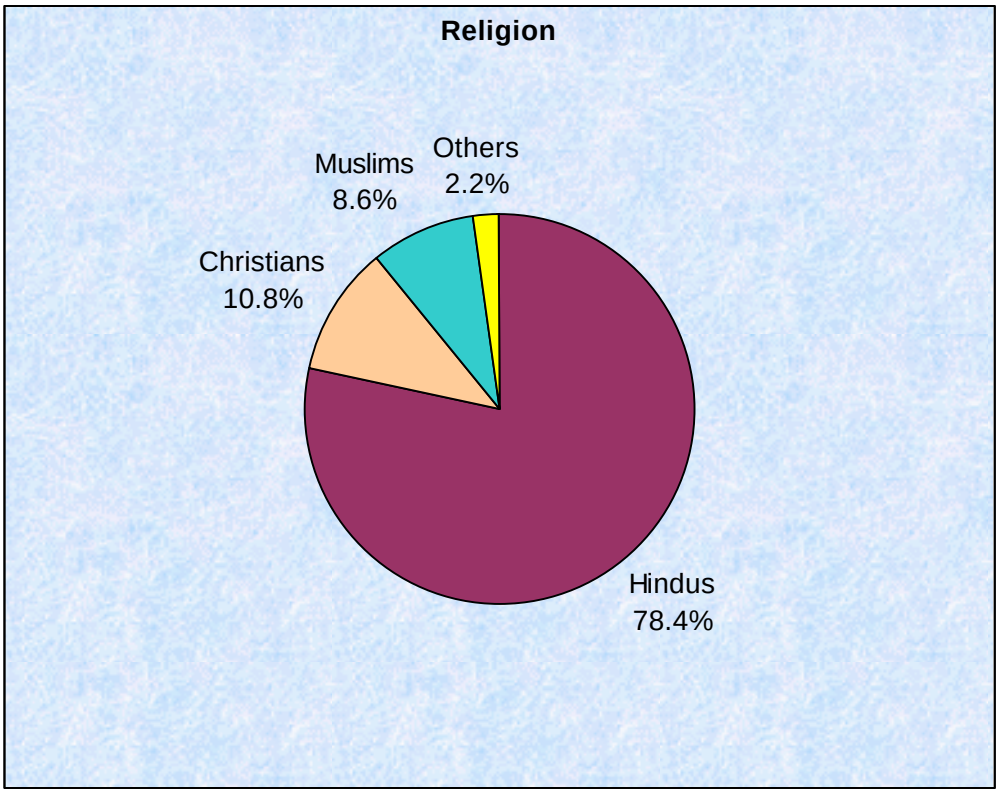

Religion
Muslims
8.6%
Others
2.2%
Christians
10.8%
Hindus
78.4%

Table . 4

Age at marriage

Age at marriage (years)	Number	%
15	4	0.8
16	33	6.8
17	119	24.4
18	219	44.9
19	113	23.2

Most of the marriages had taken place at 18 years (44.9%) followed by 17 years (24.4%). Marriages in the early teens were very infrequent (0.8%) at 15 years, 6.8% in 16 years and 23.2% from 19 years.

Husband's age at marriage

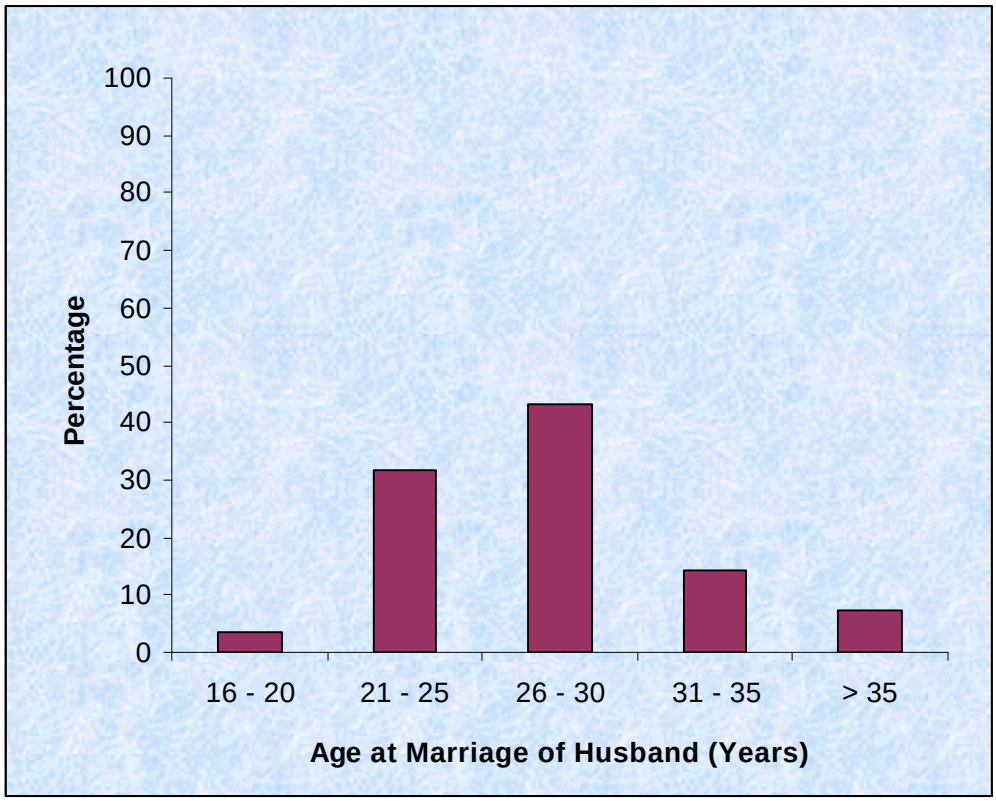
43.2% are from the age group between 26 - 30 years. 35.3% belong to age group < 25 years and 21.5% belong to age group above 30 years (Fig. C).

Consanguinity

Consanguineous marriages contributed to 27% among which 3° consanguinity formed majority of domain (18%) followed by 2° consanguinity accounting for 9% (Fig. D).

Whether first marriage

In 98.6% of cases it was the first marriage for both and the remaining 1.4% it was 2nd marriage for the male.


100
90
80
70
60
50
40
30
20
10
0
Percentage
16 - 20
21 - 25
26 - 30
31 - 35
> 35
Age at Marriage of Husband (Years)

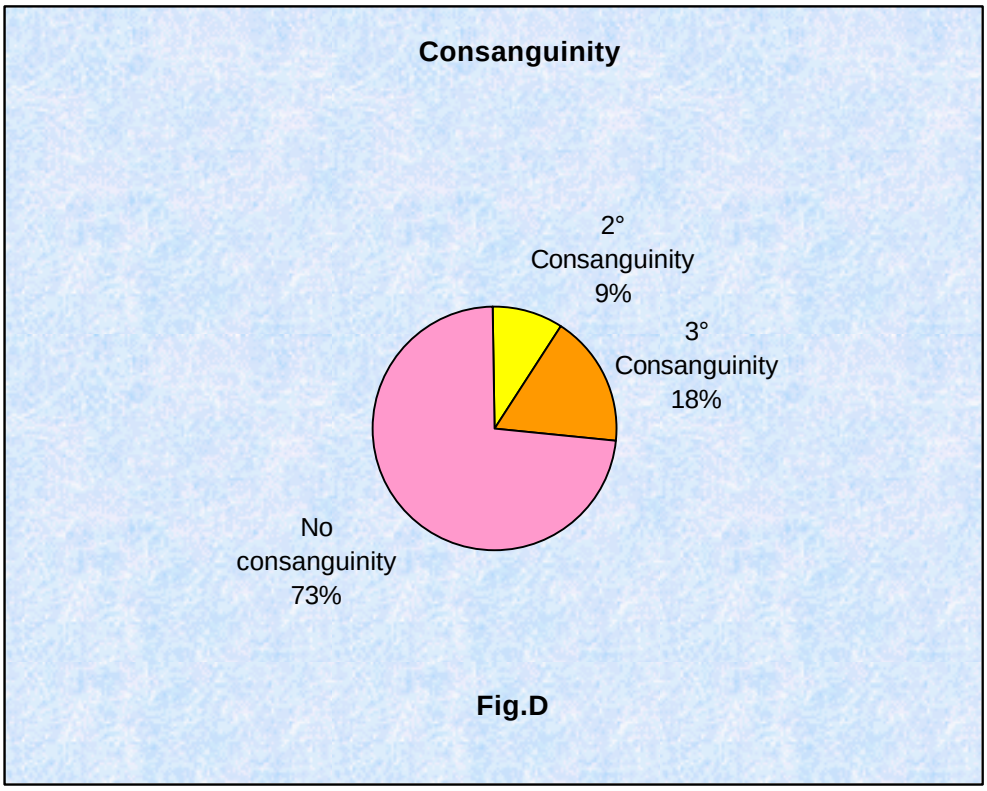

Consanguinity
2°
Consanguinity
9%
3°
Consanguinity
18%
No
consanguinity
73%

Fig.D

Table. 5

Educational Status

Educational status	Adolescent subject	Father	Mother	Husband
Illiterate	43	228	343	17
Primary School	229	178	128	188
Middle School	177	76	29	205
Higher / Plus	51	18	-	78

Mothers constituted the highest illiterate group with 68.6% followed by 45.6% among fathers and it was only 8.6% in case of teenage married women. While only 5.8% of mothers and 15.2% of fathers had middle school education, a proportion 35.4% of adolescent girls had middle school education.

Table . 6

Employment Status

Employment Status	Adolescent subject	Father	Mother	Husband
Employed	29	489	57	468
Unemployed	471	11	443	20

Mothers and teenage daughters were unemployed (house wives) accounting for 88.6% and 94.2% respectively. Only a small proportion of mothers (11.4%) and daughters (5.8%) were employed (Unskilled category) and the skilled category was negligible. Fathers were mostly unskilled workers (74.4%), the skilled category accounting for 22.6%, unemployed constituted 4.1%.

Table . 7

Occupation Categories

Occupation	Adolescent subject	Mother	Father	Husband
Professional	-	-	-	-
Clerical / Farm / shop owner	-	-	6	14
Skilled	5	-	74	106
Unskilled	24	57	410	348

Percapita income

74% of them were from lower economic strata with percapita income of less than 500 rupees, while 22.2% are from percapita of 500 - 999 rupees and 3.8% from percapita income above 1000 rupees (Fig. E).

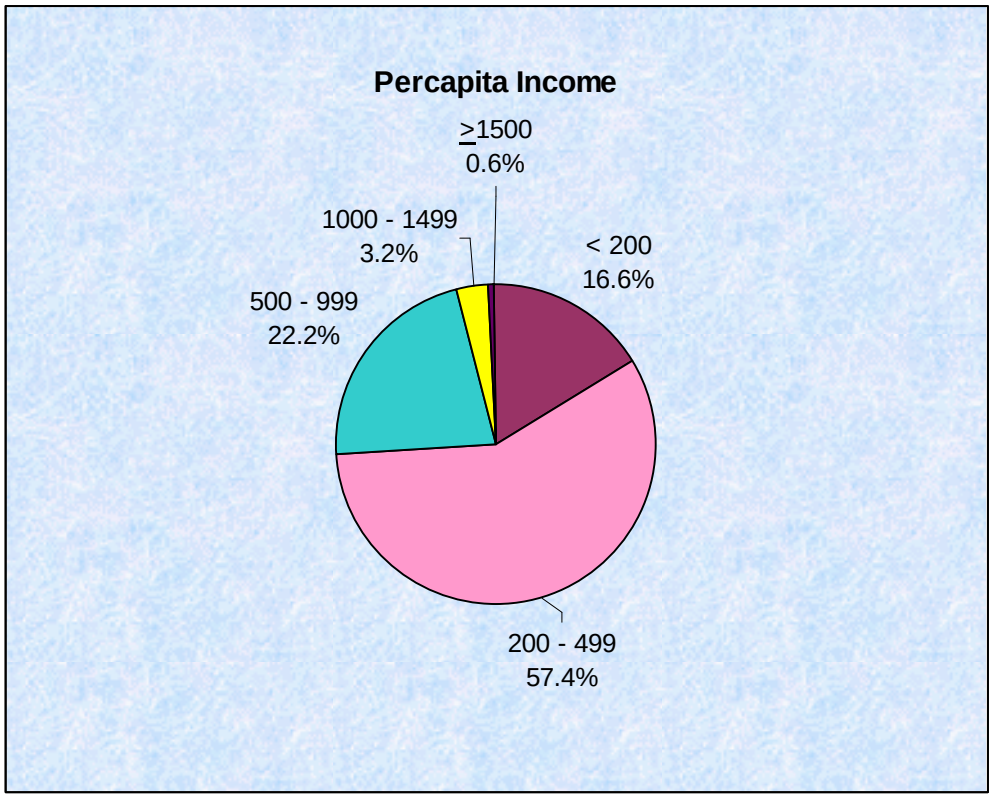
Type of Family

In married adolescent women, joint families constitute the highest proportion of 60.9%, followed by nuclear families (35.2%) and broken families (3.9%). In the unmarried group of 12 members, 58.3% are from broken families, 25% from nuclear and 16.7% from joint families.

Table . 8

Type of family (married)

Type of Family	Number	%
Joint	297	60.9
Nuclear	172	35.2
Broken	19	3.9


Percapita Income
≥1500
0.6%
1000 - 1499
3.2%
< 200
16.6%
500 - 999
22.2%
200 - 499
57.4%

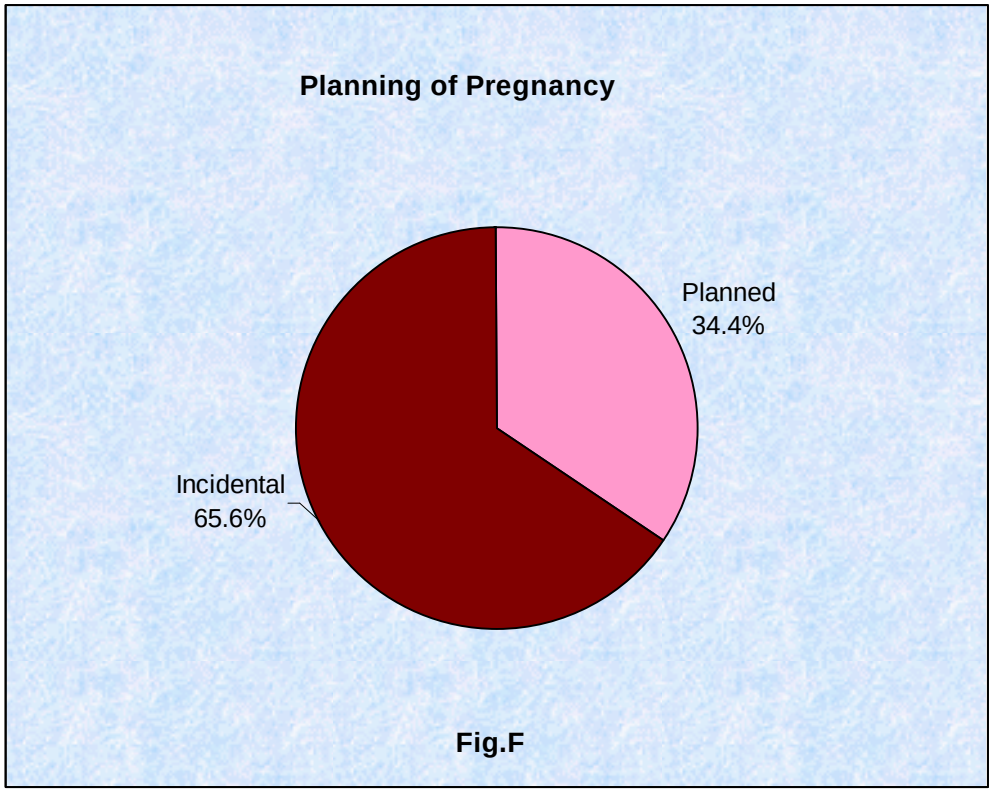

Planning of Pregnancy
Planned
34.4%
Incidental
65.6%

Fig.F

Table . 9

Type of family (unmarried)

Type of Family	Number	%
Joint	2	16.7
Nuclear	3	25.0
Broken	7	58.3

Age at menarche

Age at menarche ranged between 9 to 16 yrs. 82.4% have attained their menarche between 11 - 12 years followed by 12.4% between 13 - 14 years. Age at menarche between 9 - 10 years and between 15 - 16 years contributed 3.8% and 1.4% respectively.

Table. 10

Stated reasons for early marriage

Reasons	Number	%
Early stoppage of education	156	31.2
Consanguinity	132	26.4
Self arranged marriage	112	22.4
More siblings	79	15.8
Father’s death	13	2.6
Poverty	97	19.4
Customs	58	11.6
Ill health of parents	33	6.6
Others	9	1.8

Early stoppage of education, Consanguinity and self arranged marriage were stated to be the principal reasons for early marriage, in 31.2%, 26.4% and 22.4% of the cases. Some of the other reasons attributed were more siblings, poverty, father's death / ill health and customs.

Planning of pregnancy

65.6% of the total were unplanned pregnancies while 34.4% had planned pregnancies (Fig.F). Of the planned pregnancies, decision making by husbands and family members contributed 36% and 39% respectively. In 25% of cases, decision making was done by both partners and in none of cases the decision making was done by wife alone.

Table. 11

Decision about planned pregnancy (172 cases)

Decision making	Number	%
Self	-	-
Husband	62	36.0
Joint	43	25.0
Family members	67	39.0

Table. 12

Knowledge of contraception

Knowledge	Number	%
Yes	333	66.6
No	167	33.4

Table. 13

Source of knowledge

Source	Number	%
Health	228	45.6
Doctors	128	25.6
Media	117	23.4
Others	27	5.4

Although, 66.6% of pregnant women had a knowledge of contraception, only 19.2% adopted contraceptive measures. 33.4% had no knowledge of contraception. Health workers being source of knowledge in 45.6% followed by doctors (25.6%) and media (23.4%).

The contraceptive methods adopted, are depicted as follows:

Table. 14

Methods adopted

Methods	Number	%
Barrier	29	30.2
Hormonal	49	51.0
IUCD	16	16.7
Others	2	2.1

Table . 15

Awareness of Complications on Maternal / Baby's Health

Awareness	Number	%
Yes	17	3.4
No	483	96.6

96.6% of the teenage pregnant women were unaware of the complications and impact of early pregnancy on maternal / baby health. 3.4% had minimal knowledge of impact early pregnancy on baby and mother's health.

Table . 16

Gravida Status

Gravida Status	Number	%
Primi	441	88.2
Gravida 2	59	11.8
Gravida 3	-	-

Primi gravida accounted for 88.2% and it is alarming to notice that 11.8% were gravida 2. Of 59 cases that belong to gravida 2, 39 delivered during first pregnancy and 20 had abortions. Of 39 delivered, 36 had live children and 3 were neonatal deaths. The details of previous conception are depicted in the following tabular column which shows that higher proportion of abortions occurred in early teenagers when compared to late teens and vice versa in the delivery.

Table. 17

Details of Previous conception

Age (years)	Number	Abortion (20)		Delivered (39)	
		n	%	n	%
15	2	2	100.00	-	-
16	19	9	45.0	10	25.6
17	23	8	40.0	15	38.5
18	15	1	5.0	14	35.9

After the previous conception, only 15.25% adopted irregular contraceptive measures (9 out of 59) and the remaining 84.75% did not use contraception at all. Of the total 39 delivered cases during the previous pregnancy 31 were booked and 31 were immunized with 2 doses of tetanus toxoid and 8 cases received only one dose of tetanus toxoid. In 39 cases, the delivery places were as follows : 46.2% in rural / urban health care center, 12.8% in tertiary care hospital, 20.5% in private hospital / nursing home and 20.5% home delivered amongst which 7.7% conducted by untrained person . In 20 abortions, spontaneous were 9 and induced were 11. The details of place where induced abortions were done as follows : 5 in rural / urban health care centre, 3 in tertiary center, 2 in Pvt hospital and the last one case abortion induced by untrained person and later referred to higher center.

Neonatal outcome in previous pregnancy

59% were delivered term, 28.2% delivered preterm, 5.1% delivered postterm, and in the remaining 7.7% details were not known about gestational age. The mode of delivery was normal for 31 cases, LSCS for 6 cases, forceps 2 cases and others like abnormal presentation include 1 case.

Table . 18

Birth weight of first baby

Birth weight	Number	%
< 2.5kg	9	23.1
2.5 - 4 kg	22	56.4
> 4 kg	-	-
Not known	8	20.5

Nearly 23.1% were low birth weight babies.

Interpregnancy interval

Table. 19
Interpregnancy interval

Interpregnancy interval (months)	Number	%
< 12	10	17.0
12 - 18	17	28.8
18 - 24	24	40.7
> 24	8	13.5

86.5% of cases have an interpregnancy interval less than 24 months.

Antenatal care during present pregnancy

94.9% of the cases were booked and had atleast 3 antenatal visits while remaining 5.1% did not have adequate antenatal checkups. 96.9% received 2 doses of tetanus toxoid and the remaining 3.1% received only dose. 91.6% took full course of iron and folate supplements where as 8.4% took irregular supplements.

Antenatal weight gain

Table. 20

Antenatal Weight gain

Weight gain (in kgs)	Number	%
< 6	12	2.7
6 - 10	326	72.4
> 10	54	12.0
Not known	58	12.9

75.1% of cases have weight gain less than recommended 10 kilograms weight.

Antenatal complications

174 cases out of 450 delivered cases (35.1%) had one or more complications during their antenatal period. Complications are tabulated as follows.

Table. 21

Antenatal Complications

Complications	Number	%
Anaemia	64	36.8
PIH	38	21.8
Infections	35	20.1
Bleeding	18	10.4
Mixed	16	9.2
Others	3	1.7

Anaemia was the most prevalent complication (36.8%) among adolescent pregnant women.

Delivery details

66% delivered by labour naturalis, 24.9% by LSCS, 6.4% by forceps and others (malpresentation) contribute 2.7%.

Neonatal outcome

Table .22

Gestational age

Gestational age	Number	%
Preterm	101	22.4
Term	324	72.0
Post term	22	4.9

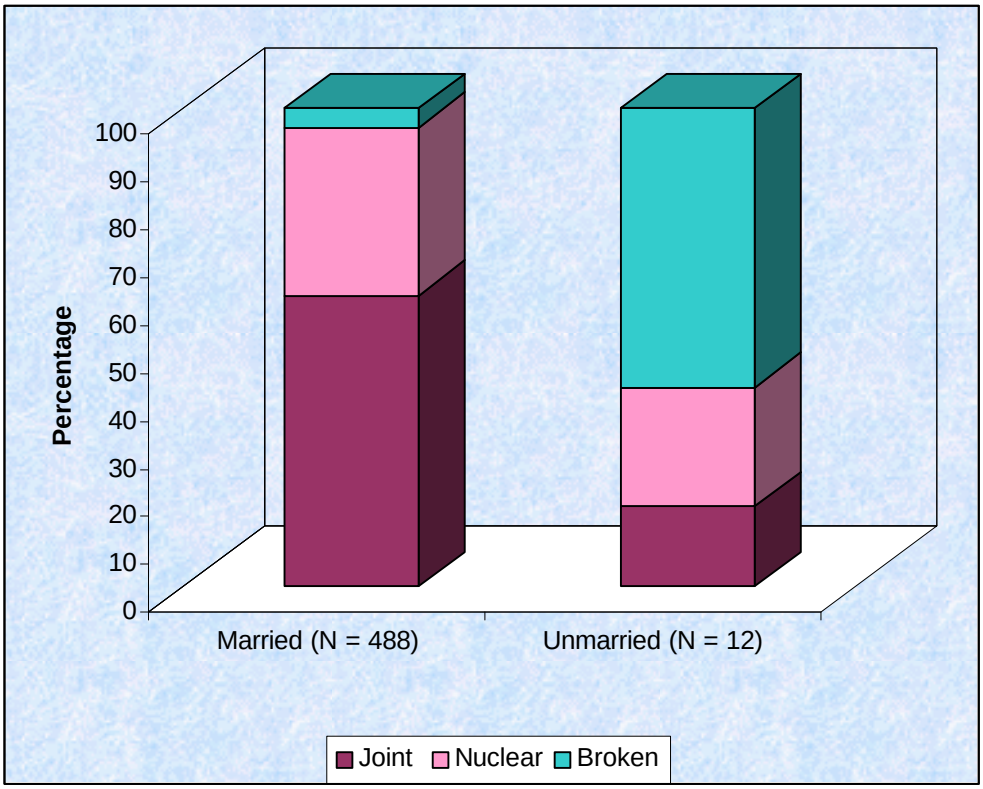
22.4% of adolescent pregnancies in the present study resulted in preterm deliveries.

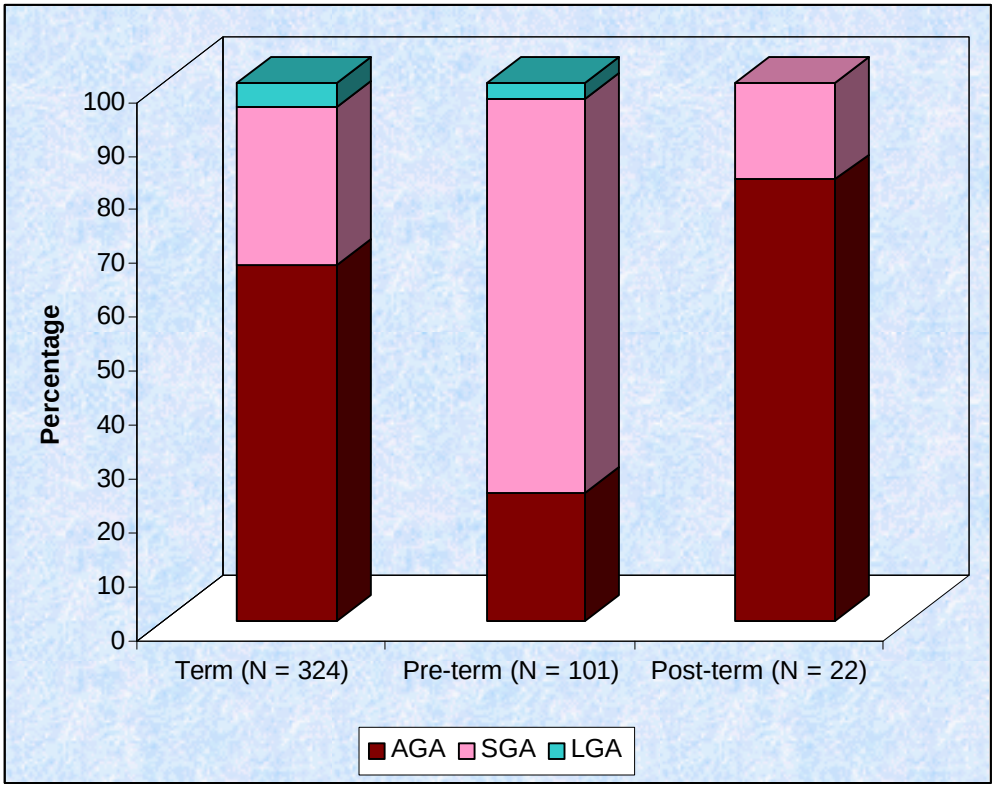
Table. 23

Birth weight

	AGA		SGA		LGA	
	n	%	n	%	n	%
Term	214	66.1	96	29.6	14	4.3
Pre Term	24	23.7	74	73.3	3	3.0
Post term	18	81.8	4	18.2	-	

3 babies were stillborn and there 22 early neonatal deaths with perinatal mortality rate constituting 5.55%. About 28% required hospitalization for neonatal complications like perinatal depression, meconium aspiration, preterm, congenital anomalies and with risk factors for early sepsis. In the present study, 44.6% were LBW babies.


Percentage
100
90
80
70
60
50
40
30
20
10
0
Married (N = 488)
Unmarried (N = 12)
Joint
Nuclear
Broken


Percentage
100
90
80
70
60
50
40
30
20
10
0
Term (N = 324)
Pre-term (N = 101)
Post-term (N = 22)
AGA
SGA
LGA

Abortion (50 cases)

Nearly 10% of adolescent pregnancies in the study group had abortions spontaneous constituted 42% of cases.

Table. 24

Reasons for abortions (Induced)

Reasons	Number	%
Medical	4	8
Eugenic	5	10
Humanitarian	4	8
Socioeconomic	13	26
Failure of contraception	3	6

43 cases of abortion were from married group and 7 cases were from unwed group. Decision making in abortion were as follows: husbands 56%, both partners 36%, Family members 8% and adolescent subject alone was none.

Time period during which abortions had occurred include 64% between 6 - 12 week, 24% between 12 - 28 weeks and in 12% less than 6 weeks.

Analysis of Inter - relationship among socio - economic, demographic factors, small family norms and neonatal outcome

Table . 25

Literacy of Adolescent women Vs Inter pregnancy interval in months

Literacy of Adolescent women	Inter Pregnancy interval in months							
	<12		12 - 18		18 - 24		> 24	
	n	%	n	%	n	%	n	%
Illiterate + Primary School (N=29)	9	31.0	11	37.9	8	27.6	1	3.5
Middle School (N=19)	1	5.3	5	26.3	12	63.2	1	5.3
Higher / plus (N=11)	-	-	1	9.1	4	36.4	6	54.6
Total = 59	**10**		**17**		**24**		**8**	

$X^2_6 = 29.6$; p - value = 0.00005

68.9% of adolescents (Illiterate + primary school education) had their interpregnancy interval < 18 months. In adolescent pregnant women who had middle school level education only 31.6% had interpregnancy interval < 18 months. Those having higher school education, only 9.1% had interpregnancy interval < 18 months. P value = 0.00005 and correlation is statistically significant.

Table . 26

Father's Literacy Vs Age at Marriage of adolescent

Age at Marriage of Adolescent (in years)	Father's Literacy					
	Illiterate + Primary		Middle School		Higher / plus	
	n	%	n	%	n	%
15 (N = 4)	4	100.00	-	-	-	-
16 - 17 (N = 152)	113	74.4	37	24.4	2	1.3
18 - 19 (N = 332)	277	83.4	39	11.8	16	4.8
Total = 488	**394**		**76**		**18**	

$X^2_4 = 16.1$; p - value = 0.003

Fathers of all adolescent who were married at 15 years of age were illiterates or had only primary school qualification. Fathers of adolescents married at age between 16 - 17 yrs of age, 74.4% of were illiterates or had primary school education and 24.4% middle school education and only 1.3% had higher school of education. In women married between age group 18 - 19 yrs, majority of their fathers were illiterates (83.4%), middle school (11.8%) and higher plus (4.8%) respectively. P value = 0.003 and hence statistically significant.

Table . 27

Per capita income Vs Use of Contraception

Per capita income (in Rupees)	Use of Contraception			
	Yes		No	
	n	%	n	%
< 500 (N = 370)	54	14.6	316	85.4
> 500 (N = 130)	42	32.3	88	67.7
Total = 500	**96**		**404**	

$X^2_1 = 19.5$; p - value = 0.00001

Those belonging to lower economic strata with per capita income less than 500 only (14.6%) used contraception whereas in those belonging to per capita income > 500, 42/130 (32.3%) used contraception. p value = 0.00001 statistically significant.

Table . 28

Literacy of adolescent women Vs Use of Contraception

Literacy of adolescent women	Use of Contraception			
	Yes		No	
	n	%	n	%
Illiterate + primary school (N = 272)	5	1.8	267	98.2
Middle School (N = 177)	53	30.0	124	70.0
Higher plus (N = 51)	38	74.5	13	25.5
Total = 500	**96**		**404**	

$X^2_2 = 166.6$; p - value = 0.0000

Only 1.8% of adolescents from illiterate and primary school education used contraception in contrast to adolescents from middle school and higher school of education, which amounts to 30% and 74.5% respectively. p - value = 0.0000. (< 0.001).

Table . 29

Per capita income Vs Age at Pregnancy

Per capita income (in Rupees)	Age at Pregnancy (in years)									
	15		16		17		18		19	
	n	%	n	%	n	%	n	%	n	%
< 200 (N=83)	3	3.6	1	1.2	21	25.3	37	44.6	21	25.3
200 - 499(N=287)	1	0.4	14	4.9	43	15.0	71	24.7	158	55.1
500 - 999 (N = 111)	-	0.0	4	3.6	17	15.3	48	43.3	42	37.8
> 1000 (N = 19)	-	-	2	10.5	6	31.6	4	21.1	7	36.9
Total = 500	**4**		**21**		**87**		**160**		**228**	

X^2_{12} = 49.3; p - value = 0.00000

Table . 30

Type of family Vs Marital Status

Type of family	Marital Status			
	Married		Unmarried	
	n	%	n	%
Joint (N = 299)	297	99.3	2	0.7
Nuclear (N = 175)	172	98.3	3	1.7
Broken (N = 26)	19	73.1	7	26.9
Total = 500	**488**		**12**	

$X^2_2 = 70.93$; p - value = 0.0000

Most of the unmarried pregnancies were from broken families (7/12) while joint and nuclear families are 2/12 and 3/12 respectively. Broken families had higher risk for illegitimate pregnancies. p value = 0.0000 (<0.001).

Table . 31

Age at Pregnancy Vs Marital Status

Age at Pregnancy (in years)	Marital Status			
	Married		Unmarried	
	n	%	n	%
15 (N = 4)	2	50.0	2	50.0
16 (N = 21)	17	81.0	4	19.0
17 (N = 87)	82	94.3	5	5.7
18 (N = 160)	159	99.4	1	0.6
19 (N = 228)	228	100.0	-	-
Total = 500	**488**		**12**	

$X^2_4 = 75.46$; p - value = 0.0000

Most unwed pregnancies occurs in early teens (15 - 17) yrs and only negligible in late teens (18 - 19 years).

Table . 32

Age at Pregnancy Vs Outcome of Pregnancy

Age at Pregnancy (in years)	Outcome of Pregnancy			
	Aborted		Delivered	
	n	%	n	%
15 (N = 4)	2	50.0	2	50.0
16 (N = 21)	9	42.9	12	57.1
17 (N = 87)	19	21.8	68	78.2
18 (N = 160)	14	8.8	146	91.2
19 (N = 228)	6	2.6	222	97.4
Total = 500	**50**		**450**	

$X^2_4 = 59.9$; p - value = 0.0000

Early teens (15 - 17 years) have higher percentage of abortions when compared to late teens (18 - 19 years) p - value < 0.001.

Table . 33

Literacy of Adolescent women Vs Neonatal Outcome

Literacy of Adolescent women	Neonatal Outcome							
	Term		Preterm		Post term		Still births	
	n	%	n	%	n	%	n	%
Illiterate + Primary School (N=248)	177	71.4	58	23.4	10	4.0	3	1.2
Middle School (N=158)	119	75.3	34	21.5	5	3.2	-	-
Higher / plus (N=44)	28	63.6	9	20.5	7	15.9	-	-
Total = 450	**324**		**101**		**22**		**3**	

$X^2_6 = 15.6$; p - value = 0.02

Preterm deliveries and still births were higher in the adolescent who were illiterate or had only, primary school education compared to those who had middle or higher school education. p value is statistically significant.

DISCUSSION

A hospital based cross sectional quantitative survey was undertaken among 500 adolescent pregnant women attending I.O.G. for their delivery / abortions. The results of the study relating to various socioeconomic differentials and the magnitude and direction of their impact on the nuptial patterns during adolescence and associated health risk factors were evaluated in terms of their implications for fertility control and improved health care.

Age at Pregnancy

Maximum cases were found to belong to late teen (18 - 19 yrs) constituting 77.6% as compared to early teen (22.4%). Various studies showing incidence of teenage pregnancies by age distribution from studies conducted in India.

Incidence of teenage pregnancies by age distribution -studies from India

Author's name and Year of study	Age group (years) studied					
	£ 15	16	17	18	19	?19
Ghosh & Ghosh, 1976	1.98%		12.84%		14.82%	
Padte et al., 1989		18.18%		81.82%		10.09%
Sarkar et al., 1991	11.86%			88.14%		18.68%
Nayak et al., 1992		1.9%	1.9%	48.6%	47.5%	8.61%
Kushwaha et al., 1993		53.3%		46.7%		

Age at marriage

Most teen pregnancy in the world occurs within the context of marriage. The relationship of adolescent pregnancy and marriage is complex and subject to various cultural influences around the globe. In general, if the teenage female marries younger than her peers, she tends to have less education, live in more poverty and be more subject to the control of family members and often an older partner (including the important issue of timing of her children). The age of marriage varies in different countries. For example, teen marriage occurs in three - quarters of teen females in Bangladesh and 14% in Philippines as well as Srilanka. In China, where the government has set a specific minimal age for marriage, 5% of the teen females are married. In general, less than 30% of teen females in North - Africa and the Middle East are married except for nearly 50% in Yemen.

In the present study, 44.9% teenagers are married at 18 yrs followed by 24.4% at 17 yrs, 23.2% at 19 yrs, 6.8% at 16 yrs, 0.8% at 15 yrs. The age at which a female marries and enters the reproductive period of life has a great impact on her fertility. The Registrar General of India collected data on fertility on a national scale and found that females who marry before the age of 18 gave birth to a large number of children than those who married after.

In India, some demographers have estimated that if marriages are postponed from the age of 16 to 20 - 21, the number of births would decrease by 20 - 30%.

Husband's age at Marriage

43.2% of men married to adolescent girl were from age group 26 - 30 yrs, followed by 31.8% from age group 21 - 25 yrs, 3.5% below 20 yrs and 7.4% above 35 yrs. Almost 2/3 of American adolescent mothers state their partners are more than 20 yrs of age and a considerable number have partners at least 6 yrs older than themselves (Moore et al, 1997). The age difference in Asian countries varies by 3 - 6 yrs versus 5 - 10 yrs in middle east countries, studies in united states note that these older partners, may force their younger partners into sexual abuse and unwanted, unplanned pregnancies. If the father is a teen, he is less capable than many older partners in providing for mother and child.

Residence

62.2% were from urban population. This may not be a true reflection of the level in the community, as the referral centre where the study is conducted caters a majority of urban population than from rural areas.

Type of delivery

Most of adolescent teenage pregnant women lived in huts and kutcha houses. only 5.6% lived in pucca houses. This gives an indirect assessment of the socioeconomic strata.

Religion

In the present study, Hindus contributes 78.4% followed by Christians 10.8% followed by Muslims 8.6%. This may be because major population from the community were Hindus. The National Family Health Survey reported a total fertility rate of 3.59 among Muslims as compared to 2.78 among Hindus. Muslims have a higher fertility rate than Hindus. The total fertility rate among Christians was found to be 2.44.

Marital Status

In present study, most of the teenage pregnancies (97.7%) were legitimate ones as compared to west. Illegitimate pregnancies contribute 2.4%. Most are married which shows the ethic and morality of our society. Marriages in Indian societies are universal and sacramental.

Type of marriage

Self arranged marriages in the present study were surprisingly high (23%), perhaps on account of the life style and social environment. Similarly, consanguinity also had a high prevalence of 27%. In various studies conducted at the community levels showed a prevalence of 20.61%.

Literacy Status

In the present study, literacy of adolescent women shows a significant correlation with inter pregnancy interval p - value (0.00005). Lower the literacy level, lower was the interpregnancy interval. The correlation between literacy level and neonatal outcome is statistically significant with a p - value (0.02).

The National Family Health Survey shows that the total fertility rate is 1.5 children higher for illiterate women than for woman with at least a high school education.

A number of studies in India had revealed a significant positive relationship between education and mean age at marriage i.e. higher the education, higher the mean age at marriage (Audinarayana 1990[11], Adlaka et al. 1991[14] and Zachariah, 1984[17], Chacko et al 1996[13]).

In the present study, education status of father and age at marriage: 45.6% of father and 68.6% of mother of adolescent pregnant women were illiterate. Fathers of all adolescent pregnant women, married at 15 yrs of age were illiterate or only had primary school education. Fathers of adolescent pregnant women married between 16 - 17 yrs: 74.4% were illiterate / primary school education and those married between 18 - 19 yrs: 83.4% were illiterate / primary school education. p value is statistically significant. But other studies conducted by chocko et al (1995& 1996) reported an inverse relationship between the educational level of father and age at marriage of daughter, which according to them was not explainable other than, in terms of level of education of daughters.

Employment status

In the present study, 94.2% of adolescent pregnancy were unemployed of the remaining 5.8% who were employed : 69% were employed in unskilled work. In mothers of these adolescent group, 88.6% were unemployed and 68.6% were illiterates. Considering the employment status of the father, 97.8%

were employed in which unskilled and skilled amounts to 83.8% and 14.9% respectively. This shows that most adolescent pregnancy occurs in families with unemployed and illiterate parents. Therefore as pointed out by chacko et al (1996) improvement in level of education and employment opportunities of society will have a positive impact on age at marriage and hence pregnancy.

Per capita income

In the present study, most adolescent pregnancies were from economic strata with per capita less than 500 rupees constituting 74.0%. Operational research studies support the hypothesis that economic status bears an inverse relationship with fertility. The total number of children born declines with an increase in per capita income of the household. The world population conference at Bucharest in fact stressed that economic development is the best contraceptive. It will take care of population growth and bring about reduction in fertility.

Moreover in view of the results of present study which pointed out to the parents apprehension of deviation of daughters like self arranged marriage, in the absence of channels for self actualization and gratification. As has been pointed out by chacko et al (1996) the principal approach should be to educate the parents that the solution does not lie in early marriage. An intervention programme, besides including an awareness component as pointed out above should necessarily involve employment of the adolescent women by providing for gainful employment opportunities through organising them into co - operatives, imparting feasible skills, provide initial credit support to make them gainfully self employed.

Infact, the report of Registrar general of India (1988)[10] had drawn attention to the interdependence of socio-economic differentials in determining the age at marriage whereas it has been stated that women with high school education and above marry 3 - 4 yrs later both in rural and urban areas, but occupation and economic status independent of education doesn't show much influence on age at marriage of girls.

From the present study's statistical analysis, it was found that lower the percapita income, lower the use of contraception with a significant Chi-Square value of 19.5 and p - value being 0.00001. It was also found that lower percapita income is associated with early teen marriage (p - value = 0.00000). A twofold strategy might be attempted to shift the age at marriage beyond 20 years by improving the educational status of teenage girls, beyond the higher secondary stage and improving the general economic status through creation of assured and remunerative employment opportunities. Such an empowerment programme would impart self confidence, self reliance and financial liability, the results of which would certainly be positive in terms of postponement of marriage beyond teenage. They would also act as source of awareness and motivation for the other members of the community.

Measures like targeted public distribution systems to supply essential commodities to the economically vulnerable strata at greatly subsidized prices would help in saving a part of their income which in all likelihood the parents might utilize for educating their children. What such educational and employment could do in terms of postponing the marriages needs no elaboration.

Type of family

In the present study, 60.9% of the adolescent marriages were from joint families. This may reflect the fact that in Indian societies, general proportion of joint families more than nuclear families. There is strong positive correlation between the type of family and unmarried pregnancies i.e. unmarried pregnancies are higher in the broken families (p value 0.0000 statistically significant). Self arranged marriages were relatively more common in nuclear families (60 out of 112 cases) followed by joint families (49 out of 112 cases) and in broken families (3 out of 112). This indicates a feeling of insecurity being the determinant factor promoting adolescent marriages in early teens.

Age of menarche

As per secular tends, the mean age of menarche has come down in girls and in the present study the majority of girls attained menarche between 11 - 12 years. This may be proposed as a reason for early marriage leading to enhanced fertility.

Planning of pregnancy

Only 34.4% of pregnancies in adolescence in the study group were planned and only in 25% of cases above decision making done by both partners. Being socially and economically poor, the adolescent women became victims of gender bias and tend not to have any decision making powers particularly regarding conception and contraception.

Awareness

The results of the present study had brought out certain interesting trends in respect with awareness on the desirability of small families, the contraception practices and attitudes. Nearly 66.6% of the teenage mothers were aware of all the four methods of contraception. However 80.8% didnot follow any contraceptive measures. It was very heartening to note that the public Health care system has been very effective in terms of creating awareness as also extending medicare. In fact, the doctors and heath workers have been the principal source of awareness regarding family planning methods. Being an Urban referral center, to some extent the benefit of electronic media (TV), Radio etc) also help in this regard. It is alarming to note that 96.6% of the adolescent pregnant women in the present study group were unaware of the complications of early pregnancy on maternal and baby health.

Gravida Status

It is noteworthy that in the present study, 88.2% were primigravida and the remaining 11.8% were Gravida 2. In 59 cases which belong to gravida 2, 39 delivered and 20 aborted during their first pregnancy. In delivered group, male children were 16 out of 39 and the female children were 23 out of 39. Various studies indicate that 10 - 25% of all births occur within 1- 5 years of married life, 50 - 55% of all births within 5 - 15 years of married life. Births after 25 years of married life are very few. This suggests that family planning efforts should be concentrated in the first few years of married life in order to achieve tangible results.

Details of Previous Pregnancy

In the present study, age distribution of the previous pregnancy shows that lower the age at first conception, more the risk for abortions. As the age advances, abortion rates decreases from 100% at 15 years to 5% at 18 years of age. Illegal abortions contributed to 15% i.e. 3 out of the total 20 cases. About 46.2% delivered in rural / urban health care center, 12.8% in tertiary care hospitals and home deliveries amounts to 20.5% amongst which 7.7% were conducted by untrained people. 56.4% of neonates delivered had normal birth weight followed by 23.1% who were LBW and 20.5% cases birth weight not known.

Inter pregnancy interval after the first teenage conception in the study group was analyzed. It is found that 54.2% of adolescent pregnant women had an interpregnancy interval of more than 18 months and the remaining 45.8% had interpregnancy interval less than 18 months. There is positive correlation between literacy of adolescent woman and interpregnancy interval indicating lower the education status, lower the interpregnancy interval with p-value of 0.00005.

Him - Tai - Hun (1982)[38] in his study found that early marriage was mostly associated with a certain degree of adolescent sub fecundity. Rajarathinam (1986)[39] reported that though the prevalence of sub fecundity seems to be higher among early marriages, the effect of sub fecundity and fertility, was only temporary and usually did not help to nullify the fertility differentials due to age. As pointed out by Rajarathinam (1986)[39], the mere delay in the occurrence of births itself can reduce the growth of population by

increasing the intervals between generation because the children born late will also be late to grow up, to marry and to reproduce and this delay process could continue generation after generation. Srivastsava (1990) studies imply that delaying age at marriage holds good in delaying pregnancy.

Since, legal intervention may not help in significantly raising the age at marriage and consequently pregnancy, the major emphasis should therefore be on promotion of socio-economic development, the most effective and important, components of which being female education and female participation in economic activities especially in skilled and technical jobs as suggested by Srivastsava (1990)[25]. To end this, the need for creation of appropriate social climate, and end to sex discrimination, creations of additional employments best suited to women and providing for appropriate training facilities for improving technical skills need to be given priority.

Antenatal care during present pregnancy

From the present study group, 94.9% of adolescent pregnancy women during their present pregnancy were booked and had at least 3 antenatal visits one in each trimester. But 96.9% had received 2 doses of TT and the remaining 3.1% also had received atleast one dose of TT. The near total coverage of the adolescent pregnant with tetanus vaccination and distribution of iron tablets of them by health personnel testified to the great efficiency and commitment with which the health personnel of the health parts, primary health centers, Govt hospitals and corporation hospitals have been carrying out their duties all along.

Adolescent pregnancy besides detrimentally influencing the birth rate resulting in enhanced population growth rate have also been reported to be associated with several medical risk factors both antenatal and postnatal. These factors adversely affect the teenage mother and the newborn and thus raise several issues of concern related to public health care.

Weight gain during pregnancy in the present study shows that 72.4% of adolescent pregnancy women have weight of gain between 6 - 10 kg although the recommended weight gain during pregnancy is above 10 kg. This in turn will produce a negative vicious cycle : malnourished mother → LBW girl child → Sex discrimination to female child (lower literacy, nutrition) → under nourished adolescent girl → early marriage → LBW babies .

Medical risk factors

The present study, clearly depicts that 35.1% of adolescent pregnant women had some form of complications during their pregnancy. Anaemia was the most common antenatal complication with a prevalence of 36.8% in this study group. While shobana patted (1997)[26] reported a prevalence of 16.9% and R.S.R.M Hospital (1982)[28] reported a higher incidence of 74%, 80 percent have been reported by Guptha and Mirchandani (1978) [29] and Rani et al (1992)[27]. The prevalence thus varied among groups. In the present study, PIH (21.8%) comes next to anaemia followed by infections (20.1%), bleeding (10.4%) and mixed problems in 9.2%.

It is an established fact the anaemia is a leading cause of increased maternal morbidity and also influences the infant mortality rate through low

birth weight. The problem of anaemia thus needs to be squarely tackled at the right stage and very effectively in order to reduce the risk of maternal as well infant mortality and improving the general health of the future generation by improving birth weight. Although 91.6% took regular iron and folate in the study group, the prevalence of anemia is still high. Therefore, ensuring proper nutritional balance of the adolescent girl through appropriate improvements in the general employment and income levels of their parental families may be the right approach.

Neonatal problems

Preterm delivery is yet another risk factor prevalent among adolescent pregnancy. Univariate analysis by cooper and Alexander (1995)[33] had indicated that the younger adolescents were at the highest level of risk for preterm deliveries, LBW and SGA babies. And more so, present study also emphasize a correlation between literacy of adolescent women and gestational age of the baby, p-value (0.02) is statistically significant. It also clearly brings out the fact the incidence of SGA babies bears a directly proportional relationship to the gestational age i.e. SGA babies are higher in preterm babies followed by term babies. There appear to be considerable differences in birth weight data for teenage mothers in different studies from India. Gupta and Mirchandani (1978) and Pawar and Shrotri (1987) reported average birth weights for teenagers to be 2361 gms and 2400 gms respectively while corresponding figures for controls were around 2600 gms in both studies. On the other hand, Sen (1974) and Srinivasan et al. (1983) reported average birth weight of babies born to teenage mothers to be around 2700 gms. Indian data on incidence of low birth weight babies among teenage pregnancies vary widely from 25 - 50%. In the present study, 44.6% were LBW babies.

Fetal complications in teenage pregnancies

Year	Author's Name	Incidence of LBW		Incidence of prematurity	
		Teens	Control	Teens	Control
1981	Biswas & Goswami			15.3%	11.2%
1985	Bhattacharya & Chowdhury			34.6%	32.9%
1991	Chhabra	11%	7%		
1992	Nayak et al	50.5%	38.9%		
1992	Verma & Das	35%	23%		
2001	Nasiri et al	6.7%	6.6%		

But the study by Broadley A. Yoder et al[35] on pregnancy outcome of teenage girls in military population came to the conclusion that premature delivery and low birth weight were related to maternal race / economic status rather than age of mother.

Abortions

Spontaneous abortions constitute a serious obstetric complications in adolescent pregnancies. It the present study, abortions constituted 10 percent, higher than 36.02 per 1000 by Spitz et al (1996)[30]. Seeniammal and Radhika, (1993)[28] reported that abortion in the teenage below 15 years was 30% whereas it was only 19.9% among, the late teenage group, whereas, Jayalaxmi et al. (1983)[28] reported an incidence of 14.7% occurring in teenage pregnancies between 16 - 19 years. But in the present study, abortions in the early teens

constituted 60% while the late teens 40%. This trend of abortions in the present study is in conformity with that of Seeniammal and Radhika (1993)[28]. Most of the abortions in the present study group were between 6 - 12 weeks and decision making is done by husband in 56%, family members 8% and both partners in 36%. Stated reasons for abortions in the present study in descending order : Spontaneous (42%), Socio-economic (26%), Eugenic (10%), Medical and humanitarian (8% each) and failure of contraception accounts for 6%.

SUMMARY AND CONCLUSIONS

- In the present study, age wise distribution of pregnancy were higher in the late adolescent group (77.6%) and majority (97.6%) of them from the study group were married. There is a strong association that unmarried pregnancies were higher in early teens and from broken families.

- The general literacy rate of adolescent women in the study group was low, 8% being illiterate and 45.8% had only primary school education. Majority of parents of adolescent study group were illiterates and hence may be a reason for early marriage in their children. There is a strong association between the literacy level of adolescent women and use of contraception and hence the interpregnancy interval. Nearly 85% of them had interpregnancy interval less than 2 years. So, the standard of education for the girls should be raised which by itself will delay teenage marriages and will improve the employment opportunities. The employment status of the adolescent group in the current study shows that 94.2% were unemployed.

- Nearly 74% of adolescent pregnant women were from lower economic strata with per capita income being less than 500 rupees. There is a strong association between per capita income and use of contraception. Therefore, introduction of socio - economic reforms aimed at reducing poverty amongst the

adolescent through gainful employment opportunities and gender equality should be undertaken. Vocational training should be encouraged to increase the productivity and earnings in the modern sector of the economy in the community.

- There appears a strong correlation between age of pregnancy and the outcome. Abortions occurred in 10% of the total pregnancies. Abortions were higher in the early teens and spontaneous abortions constitute nearly 42%.

- Medical complications during adolescent pregnancies were high (35.1%) and weight gain during antenatal period was not satisfactory. Anaemia was found to be the prevalent (36.8%) antenatal problem in the study group.

- While awareness of family planning methods was 66.6%, the adoption of such methods was lower (19.2%) and hence shorter was the inter pregnancy interval. Health workers and doctors have been instrumental in creation of awareness of small family norms. Various health education programmes should be carried out among the adolescent group about contraception and small family norms.

- About 22.4% were delivered preterm and still born accounts for 0.7% and neonatal deaths 4.8%. There was also a higher proportion (29.6%) of SGA babies among term delivered neonates. In the present study, 44.6% were LBW babies.

The problem of adolescent reproductive health, therefore requires an integrated approach where by socio-economic reforms complement the health sector with policies directed towards the poor and disadvantaged adolescent mothers, who are malnourished and are at high risk of contracting diseases many of which cause significant morbidity to both the teenage mothers and their neonates.

REFERENCES

1. Text Book of Preventive and Social Medicine - K.Park. 17th Edition, (2002) pp. 328,334,329,327

2. The World's Youth - 1996 - W.H.O. Bulletin (1996) pp.3,4.

3. Health Education in South East Asia - July (1997) pp (156, 157).

4. Coverage Evaluation Survey on Immunization Status in Tamilnadu (1996). Directorate of Public health and Preventive medicine Chennai - 6.p.24.

5. R.P.Singh and J.Richard - "Socio - Economic and Demographic correlates of Age at Marriage" Demography India, Vol. 18, No.18 C_2 (1989) pp (183 - 190).

6. S.Mukkerjee, " Age at Marriage and Family welfare", Social Change, Vol.22, No.2 (1992), pp. (35 - 39).

7. R.S.Kurp and S.Gunasekharan, "Family Formation and Socio - Characteristics, Gandhigram India", in A.R. Omran and C.C.Stanley", Family formation patterns and Health", W.H.O., Geneva (1976) - P.97.

8. U.N. 1961; Patnaik 1981, Dixton 1971.

9. P.C.Smith, "Asian Marriage Pattern in Transition" East West Population Institute, East West Centre, Honolulu, Reprint No.188 (1980).

10. Registrar General of India, " Advance Report on Age at marriage Differentials in India", occasional paper No.2, (1988).

11. N.Audhi Narayanan, "Socio - Cultural dimensions of marriage in Rural India", Mittal Publications, New Delhi (1990).

12. S.N. Agarwala, " Indian Population and Problems", Tata MC.Graw Hill Publishing Company Ltd., New Delhi (1977), pp (87 - 105).

13. Dr.C.K.Chacko, Dr.K.Devaraj, Dr.S.Ponnurej - "A study on Factors Determining Low Age at Marriage" of females and Differential patterns in Different Regions of India GRH & FWt (Gandhigram) Bulletin Vol.30 No. (1 & 2) (1995 - 1996). P - 14.

14. Arjun Adlaka, Sushil Kumar and Mohammed Ayed, " The Role of Nuptiality in Fertility Decline - A Comparative Analysis", Demographic and Health survey world conference at Washington D.C.From 5 - 7 August 1991 Vol.II. pp (947 - 955).

15. United Nations (1961). " The Mysore population study", ST/SOA series `A' No.25, New York.

16. S.Krishnamoorthy, " A Note on Relation of Education, Economic status and Age at Marriage to fertility in a Community Development Block, "South India" GRH & Fwt Bulletin Gandhigram Vol.IX, No.1 1974 pp (28 - 35).

17. K.C.Zachariah, "The Anomaly of Fertility Decline in Kerala, Population and Development series" No.25, Washington D.C. World Bank (1984).

18. A.J.Coale, " Age at Entry into Marriage and the Data of the Initiation of voluntary Birth Control", Demography, Vol. 29, No.3 (1993) pp (333 - 341).

19. Bagath, " Status of women and Age at Marriage in India", Social change" Vol.20 (No.2) (1990) pp (20-25).

20. R.S.S.Sarma, " Changing Patterns of Age at Marriage in Rural punjab, India", Studies in African and Asian Demography - C.D.C. Annual Seminar 1986, Cairo 1987.

21. Ramkumar, R.saramma Koshy and P.G. Devakiamma, "Relative Influence of Education and Age at Marriage on the Fertility of Sylan Christian women of Kerala", (Kariavattom). Family welfare Communication Action Research Centre, University of Kerala 1981.

22. United Nations : " Fertility Behaviour in the Context of Development, Evidence from the world Fertility Survey". Population studies No.100, Dept. of International Economic and social Affairs, Newyork 1987.

23. C.R.Malakar, " On Recent Developments of Marriage Models and their applications to Indian Nuptiality", Genus, Vol.43, No.1-2 (1987) pp (93 - 102).

24. S.J.Jejeeloy " Women's Status and Fertility, Successive Cross Sectional Evidence from Tamilnadu, India (1970 - 80).

25. J.N.Srivastsava, " Health and population perspective and Issues" (13) 3,4 : 14 - 128, 1990.

26. Shobhana patted, Kuntol Rao, Vehi Ram kumar" Adoloscent pregnancy". Journal of obst. and gynecology of India - April 1997.

27. P.Reddi Rani, Uma Rani, S.Soundhara Raghavan, P.Rajaram - "Adoloscent Pregnancy" - Journal of Obst. and Gynec. of India - 1992 Sept.

28. XXVII - All India obst. and Gynec. Congress, Madras, Dec. 1983 (21 - 23), 1983 pp. (16 - 39).

29. Guptha and Mirchandini J.J. journal of Obst. and Gynec. of India, Vol. 28, 1978, p.67.

30. Spitz. A.M., Velebil. P., Kognin CM., Marks J.S "Pregnancy, Abortion and Birth Rate among U.S.Adoloscents 1980,1985, 1990 - Jama 275 (13)., 1996 April - 3, pp 989 - 994.

31. Slonium - Nevo. V., Anson. J., Sova, J. " Abortion Among Teenagers - Can a Population at Risk be Identified?"Health care for women International - 16 (2) : 1995 April pp (10,121).

32. Kondamudi. V.K.and Bhatacharya Retrospective Review of Adoloscent deliveries 1987 - 88. Annuals of Tropical Pediatrics 13(4), 1993, p (379 - 383).

33. Cooper and Alexander G. "Study on Effect of Maternal Age on Birth outcomes on young Adolescents" Social Biology - 42 (1-2), 1995 spring summer pp.22 - 35.

34. Petra and otterblad obuson, " Study on Determinants of Poor Pregnancy outcomes among teenagers of sweden" - The journal of Obst.and Gynaec. Vol 89., No.3 March (1997).

35. Broadley. A.Yarder and Marking K.Yong " Pregnancy outcomes in Teenage Military population", The Journal of Obst. and Gynec. Vol.90 No.4 Oct. 1997.

36. Leppart. P.C., Nameron P.B., Horowitze American Journal of Obst. and Gynec. 152 : 623, 1985.pp.25.

37. Henderson. R.H. and Sundaresan T.," Cluster sampling to assess immunisation coverage : A Review of Experience with a simplified sampling method. Bulletin of W.H.O 60 (2) 1982 pp (253 - 260).

38. Him - Tai - Hun - 1982 - "Age at First Marriage and Birth Intervals in Koriya - " Bulletin of Population and Development studies center, Vol.XI, Korea.

39. Raja - Retnam - The Relation Between Age at Marriage and Fertility; Some Evidences From Rural Area in Tamil Nadu " G.R.H. & FWT., Bulletin. Vol. 21 No.9) Dec. 1996.

40. Alan Guttmacher Institute : Into a New World : Young Women's Sexual and Reproductive Lives. 1 - 56 pages, New York : The Alan Guttmacher Institute. (120 Wall Street, NY, USA 10005), 1998. (www.agi-usa.org).

41. American Academy of Pediatrics. Counseling the adolescent about pregnancy options. Pediatrics 101 : 938 - 940, 1998.

42. Greydanus DE, Patal D. Contraception in the Adolescent : Preparation For the 1990's Medical Clinics North America 74(5): 1205 - 1224, 1990.

43. Greydanus DE, Sananayake, P. Gains MJ. Reproductive health : An International Perspective. Indian J Pediatrics 66 : 339 - 348, 1999.

Annexure - A

PROFORMA

1. Name

2. Age

3. Residential Address

4. Place of residence - a.Rural
   b.Urban
   c.Others

5. Type of house - a.Huts
   b.Kutcha
   c. Pucca
   d.Others

6. Religion - a.Hindu
   b.Muslim
   c.Christian
   d.Others

7. Marital Status

   Married - a.Separated
   b.Widowed
   c.Divorced

   Unmarried

8. Whether - a.First Marriage
   b.Second Marriage
   c.Others

9. Age at Marriage
   Wife
   Husband

10. Educational Status of Mother
    a.Illiterate
    b.Primary
    c.Middle School
    d.Higher Plus

11. Educational Status of Father

a.Illiterate
b.Primary
c.Middle School
d.Higher Plus

12. Educational Status of Husband

a.Illiterate
b.Primary
c.Middle School
d.Higher Plus

12. Educational Status of Adolescent

a.Illiterate
b.Primary
c.Middle School
d.Higher Plus

13. Employment status

Employment Status	**Adolescent subject**	**Father**	**Mother**	**Husband**
Employed				
Unemployed				

14. Occupation categories

Occupation	**Adolescent subject**	**Mother**	**Father**	**Husband**
Professional				
Clerical / Farm / shop owner				
Skilled				
Unskilled				

15. Per capita income (in rupees)

a.< 200
b.200 - 499
c.500 - 999
d.1000 - 1499

16. Type of family

a. Joint
b. Nuclear
c. Broken

17. Age at menarche (in years)

a.< 8
b.9.-11
c.12 - 13
d.14 - 15
e.> 15

18. Stated reasons for early marriage

19. Planning of pregnancy

a. Planned
b. Incidental

20. Decision about pregnancy

a. Self
b. Husband
c. Joint
d. Family members

21. Type of marriage

a. Self arranged
b.Family arranged

22. Consanguinity

a. Yes - 1°/ 2° / 3°
b. No

23. Awareness of complication / Impact on mothers/ baby's health.

a. Yes b. No

24. Knowledge of contraception

a. Yes b. No

25. Use of contraception

a. Yes b. No

26. Type of contraception

a. Barrier
b. Hormonal
c. IUCD
d. Others

27. Source of knowledge

a. Health worker
b. Doctors
c. Mass media
d. Others

28. Gravida status

a. Primi
b. Gravida 2
c. Gravida 3

29. Previous baby details

(i) Age at 1st Conception
(ii) Whether booked & Immunized
(iii) Delivered / Aborted

30. If Delivered

*Place of delivery

(a) Home - Trained / Untrained
(b) Rural / Urban Health Center
(c) Private Hospitals
(d) Tertiary Care Center

*Mode of delivery

a. Normal b. LSCS c. Forceps d. Others

*Neonatal outcome

(i) Gestational Age - a. Term b. Preterm c. Post term d. Not known

(ii) Birth Weight - a. < 2.5 kg b. 2.5 to 4 kg c. > 4 kg d. Not known

(iii) Perinatal deaths a. Yes b. No.

(iv) Neonatal deaths a. Yes b. No.

*Admission status of baby - a. Yes b. No

31. Interpregnancy interval (in months)

a. < 12 b. 12 - 18, c. 18 - 24, d. > 24

32. Present Pregnancy details (If delivered)

*Booked - a. Yes b. No

* Number of antenatal visits

* Immunized - a. 1 dose b. 2 doses

* Iron & Folate supplements - a. Regular b. Irregular

* Antenatal weight gain (in kgs)

a. < 6
b. 6 - 10
c. > 10
d. Not known

* Antenatal Complications

a. Infection
b. Bleeding
c. Anemia

d. PIH
e. Mixed
f. Others

33. Current delivery details

*Mode of delivery

a. Normal b. LSCS c. Forceps d. Others

*Neonatal outcome

(i) Gestational Age - a.Term b. Preterm c. Post term

(ii) Birth Weight - a. < 2.5 kg b. 2.5 to 4 kg c. > 4 kg
- a. AGA b. SGA c. LGA

(iii) Perinatal deaths - a. Yes b. No

(iv) Neonatal deaths a. Yes b. No

*Admission status of baby - a. Yes b. No

34. Termination of pregnancy

* Reasons

a. Medical
b.Eugenic
c.Humanitarian
d.Socioeconomic
e.Failure of contraception

* Decision by - a. Self b. Husband c. Both d. Other family members

* Time - a. <6 b. 6 - 12 c. 12-28 (in weeks)

* Marital status - a. Married b. Unmarried

35. Other details (if any)

Annexure - B

ABBREVIATIONS

AGA	-	Appropriate for Gestational Age
LGA	-	Large for Gestational Age
SGA	-	Small for Gestational Age
LBW	-	Low Birth Weight
NFHS	-	National Family Health Survey
UN	-	United Nations
USA	-	United States of America
HIV	-	Human Immunodeficiency Virus
WHO	-	World Health Organization
MMR	-	Maternal Mortality Rate
I.O.G	-	Institute of Obstetrics and Gynaecology
IUCD	-	Intra Uterine Contraceptive Device
LSCS	-	Lower Segment Caesarean Section